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NAVAL POSTGRADUATE SCHOOL FOUNDATION, INC.

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26 July, 2005

The Honorable Anthony J. Principi
Chairman,
Defense Base Closure and Realignment Commission
2521 South Clark Street, Suite 600
Arlington, VA 22202

Dear Chairman Principi,

First, I would like to add my voice to the many that have supported the Naval Postgraduate School (NPS) as a unique and irreplaceable national asset serving the security interests of our country. I enclose a paper which details how NPS contributes to national security in many ways that could not be replicated at civilian universities and does so in a remarkably cost effective way.

The main purpose of this letter concerns the possible consolidation of NPS with the Defense Language Institute (DLI) in Monterey, California. Local officials with the City of Monterey and others have advanced this idea believing that a consolidated school would offer protection against future base closure efforts. They also cite (unspecified) base operating support savings to be realized by so doing. I believe they are wrong on both counts.

My purpose is to present what I believe to be the school's perspective on this initiative. I believe I am uniquely qualified to do so despite not being officially on the staff of NPS. I am a graduate of the school and since retirement from active duty have been closely involved with the school in several ways. For the past eight years, I have been the President of the Naval Postgraduate School Foundation, Inc.

In short, I believe consolidation with DLI would have adverse impacts on military efficiency and the cost savings would be negligible.

Military Efficiency:

At present, NPS enjoys clear lines of communication with Navy leadership, the OPNAV Staff, other Navy commands, the Combatant Commanders, and other departments. NPS supports the Department of the Navy through academic programs with strong defense components that prepare officers to deal with technical challenges of an uncertain future. Other services also take advantage of many curricula that support their educational requirements. Some 60 foreign countries also send officer students in recognition of the unique qualities of NPS – a world class faculty teaching relevant subjects, all with a defense focus, and supported by a robust research program.

Placing the school under OSD and combining with DLI would mean, I believe, that a new position would have to be created to preside over both schools. The new President would need a staff to perform this broader function, while the present NPS and DLI command organizations

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would have to remain essentially intact. Lines of communication would be blurred by this additional layer. The sharp focus that both schools now have toward their important missions would be diluted.

NPS and DLI are so different that one management model would be hard pressed to administer both schools effectively. The 1600 NPS students are mostly married, live in base housing, are in masters programs (some PhDs), and operate in a university environment. They are in Monterey for 18 months to two years, depending on the curricula.

Seventy-five percent of DLI students are entry-level enlisted service members (20% are junior and mid-grade NCOs; 5% are officers), right out of boot camp. They live in a strict military environment and are in a very demanding program of language training. They need close NCO supervision, wear uniforms, live in barracks, and are well organized to promote good order and discipline. Their military chains of command make use of "unit training schedule" time during afternoons and even weekends to sustain basic combat skills, e.g., marksmanship, chemical protection means, land navigation, extracting oneself from a minefield, etc. While the DLI language programs have some things in common with undergraduate level education at the nation's best universities, the programs and the institution itself are inherently focused on **TRAINING** young enlisted troops for military duties in operational environments.

Both NPS and DLI are well structured at present to fulfill their respective missions with high militarily effectiveness. Combining them under the Secretary of Defense and creating a single school would add a layer and could only detract from these efficient organizations.

Significant Cost Savings Are Not There

The two schools are also different in their needs for base operating support. Whereas some further streamlining will be possible, and I believe will be achieved with or without consolidation, there will not be significant savings beyond those already realized in recent years.

Initiatives for cost savings have been underway for several years at both NPS and DLI. The City of Monterey provides support to both schools through the Monterey Municipal Services Contract authorized by Congress. In 2000, DLI realized 41% savings in support costs because of city support. The DLI base operating support budget has since almost doubled, whereas the NPS budget has been reduced to a bare bones level, from \$7 million to \$3.5 million, through a series of Navy cost reduction efforts. Some other comments regarding NPS and DLI support arrangements:

- Both schools use contractors for grounds maintenance.
- DLI buildings have self-contained boiler systems whereas NPS has a central steam system for which there is presently no support opportunity with Monterey.
- Monterey provides trash removal for both DLI and NPS under an Army contract.
- Monterey provides tree service/city arborist for both DLI and NPS.
- Monterey provides asphalt resurfacing for both DLI and NPS.
- NPS works with Monterey for storm water runoff, parking and traffic issues and many other installation areas.
- NPS, DLI and Monterey have aligned their respective fire and police services so that each can fully accomplish its mission and back each other up in case of emergency. Monterey provides fire services for NPS.

There are a wide variety of other cooperative arrangements between NPS and DLI, ranging from joint motorcycle training courses to alignment of MWR programs to avoid duplication and offer a better product to both NPS and DLI without competing against each other. NPS and DLI are jointly developing a congressionally mandated program for affordable housing for faculty and staff. NPS and DLI use an Army medical center for students and are working on a similar center for dental care scheduled for completion in 2006. NPS and DLI have worked together in communications, fiber optics (with great help from Monterey), a joint community military newsletter, and various academic programs.

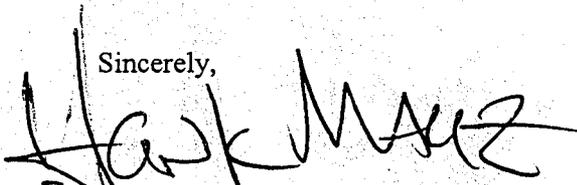
The City of Monterey and others suggest that savings could occur through consolidation of functions like library support, public affairs, and student registrars. A careful examination indicates that no real savings in these areas can be realized.

The point in going through this litany is to dispel the notion that the two institutions are stand-alone stove pipes that exist in splendid isolation and are duplicative in many support areas. IT JUST ISN'T SO. Could there be some more savings through closer cooperation? Sure, maybe in the purchase of future computer or information systems and the like. But these savings would be on the margin and can be achieved in any case without a consolidation. Navy leadership is committed to that effort.

In summary, both NPS and DLI are doing superb work in support of national security. Their missions are very different and they should retain their unique organizational structures designed to serve their respective needs. Purported cost savings through consolidation are overstated, and indeed not even quantified. Whatever savings may occur will be minor and offset to some degree by the additional staffing that a new consolidated command structure would require. Military effectiveness would not be enhanced by consolidation. As for protection against future base closings, the schools should stand or fall on their own merits, and being directly under OSD is no guarantee of security.

I note that the site visits to Monterey by BRAC Commissioners and staff in early August will be very brief and will not allow time for an in-depth review of all the issues involved. I hope that the information presented above will help fill the gap, and I urge that the initiative to consolidate NPS and DLI be set aside.

Sincerely,



Henry H. Mauz, Jr.
Admiral, U.S. Navy (ret)

Copy to:
Secretary of the Navy
Secretary of the Army
Chief of Naval Operations.



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August 4, 2005

The Honorable Anthony Principi
Chairman, Defense Base Closure and Realignment Committee
2521 South Clark Street, Suite 600
Arlington, VA 22202

Dear Chairman Principi,

I am writing again about the Naval Postgraduate School in Monterey. There is one important aspect of activity at the school that I believe has not received attention by your commission as yet. That aspect is the significant and growing support to the school provided by the Naval Postgraduate School Foundation, Inc. I am proud to have been the President of the foundation for the past eight years.

The NPS Foundation was established in 1971 and has since provided direct support to the school in several ways. We raise funds for the school's most urgent needs in areas that the Navy's budget can't cover or where existing budget authority is inadequate. These areas include recognition for academic achievement, teaching excellence, conference support, library support, equipment and software, classroom upgrades, alumni support, student programs, professorships, special events and research support. We are on track this year to provide over a million dollars worth of support to NPS.

Our other efforts include promotion of the school to audiences across the nation. NPS is not well known outside the local area, yet it is a great school with a world-class faculty that makes significant contributions to present and future national security every day. We also help establish links between NPS and industry. This linkage has produced many benefits for both NPS and industry, particularly in the research area.

We have developed a wide network of friends of the school, both individuals and corporations. That network is growing, but I must admit that our progress in fundraising has been affected by the uncertainty associated with the BRAC process. One of our donors, who pledged \$5,000.00 a year for the next five years, has made it clear that his pledge will be null and void if NPS is realigned, moved, or privatized. That sentiment is widespread. Our major donors embrace the mission and accomplishments of NPS. That loyalty is not easily transferred to a consolidated school under OSD.

I recognize that the concerns of a relatively small foundation are not a major factor in your BRAC deliberations. Nevertheless, we are making a significant contribution to NPS and we are poised to expand our efforts on behalf of NPS in the future.

Sincerely,

Henry H. Mauz, Jr
Admiral, U.S. Navy (ret)

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December 14, 2004

In August 2000, the *Naval Institute Proceedings* published an article written by Admiral Henry H. Mauz, Jr., USN (retired), President of the Naval Postgraduate School Foundation (NPSFI), and William R. Gates, a member of the Naval Postgraduate School (NPS) faculty.

While maintaining its core competency, NPS has changed in several important aspects in the four years since that article was published. The events of September 11, 2001, and the ongoing War on Terrorism have had profound impact on the school.

The enclosed paper is a product of the NPS Foundation and it updates the earlier *Proceedings* article. It also expands discussion of NPS' contributions to the complex national security environment our nation faces now and in the future.

Sincerely,

Henry H. Mauz, Jr.
Admiral, USN (retired)
President

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Overview and Executive Summary

"This ... university has a clear vision of its mission – to accelerate innovation in the Navy and Department of Defense through teaching and research to help keep our ... services the best in the world." President George Herbert Walker Bush

The Naval Postgraduate School would today more aptly be named the Defense Graduate University. The school has evolved over the years, especially in recent times, to become a joint service university for some 1600 students in masters and Ph.D. academic programs. The Navy percentage of the student body has fallen to 42%, not because of fewer Navy students but because the other services and about 60 foreign countries are also sending their best and brightest to Monterey. The school is growing both in the number of students and in curricula to meet emerging needs.

But why is it so important for officers to receive graduate education? Simply put, the United States operates in a complex and changing security environment. Military officers must understand that environment and contribute to the shaping of future national security policies. Officers must manage huge amounts of the public treasury in the execution of annual budgets. Officers not only operate the most complex and modern equipment but also must participate in the design and procurement of future systems ranging from computers to sensors and from ships to aircraft.

The academic programs at NPS could not be replicated at civilian universities because specialized military content is added to the basic academic programs of every curricula. Moreover, leading edge research is part and parcel of degree programs with students and a distinguished faculty working together in research related thesis work. Not only are NPS degrees fundamentally different from degrees offered by civilian graduate schools, they are more cost effective.

NPS is the graduate school of choice for military officers

Unlike most, if not all, civilian universities, NPS has a curriculum focused on meeting the needs of military officers. The defense-focused curriculum offers the opportunity for officers to gain training and experience in a wide variety of unique areas such as Homeland Security, Naval Systems Engineering, Combat Systems, Computer Science and Technology and more. Even the more traditional degree programs are taught within a military framework, making the experience more useful to the students in their military careers. NPS acts as one of the few institutions which act as a link between military and civilian educational worlds.

NPS is swift to respond to changing fleet and national security needs

The teaching and research programs conducted at NPS are constantly reviewed and evaluated by Navy and other military officers as well as the Department of Defense (DoD) for responsiveness to current military operations. The highly interdepartmental nature of the curricula allows for rapid development of new programs. Research activities are also highly responsive to current national security needs since these activities are sponsored by military commands. As seen in the Afghanistan and Iraq conflicts, NPS responds quickly to emergent

DOD war-fighting requirements and applies science and technology to address near term and high profile issues.

NPS research is uniquely useful to Navy and DOD activities

NPS research centers and institutes focus their work on projects for specific Navy, DoD and other military needs. Fully 85% of reimbursable research involves projects with direct military applications, a situation not likely to be replicated on civilian university campuses. At the same time, military research often results in discoveries which have important uses in the civilian environment. In addition, students are required to complete a research thesis or project which addresses some military topic.

NPS compares favorably with other universities on measures of quality

A comparison of NPS with civilian universities on a variety of measures reveals that NPS ranks highly against its peers. In areas such as graduation rate, faculty to student ratio, and student contact hours, NPS ranks at or near the top. At NPS, students experience a high level of direct contact with faculty.

A degree costs much less at NPS than at a Peer University

The higher number of student contact hours at NPS results in a master's degree being accomplished in just 18 months rather than the 28 months it would take at a civilian university to achieve the same contact hours. This means lower direct cost of instruction but also less cost in student salary making NPS the most cost effective choice for military graduate education.

NPS graduates show the value of their education in future assignments

Through its impressive number of outstanding and distinguished alumni, the continuing value of an NPS education can be seen. Alumni include astronauts, service secretaries, hundreds of officers of flag rank and civilians who became CEOs of large corporations.

NPS provides daily interactions among military officers of other nations and U.S. offices of different services

Opportunities for graduate education are provided for military officers from a large number of foreign countries. International students represent 60 different countries and accounted for approximately 20% of the average student enrollment. While administered by the Department of the Navy, NPS provides education for officers from all branches of the U.S. armed services. Students, regardless of service or international origin, share classroom experiences.

NPS exists geographically in a symbiotically rich military and technological environment

NPS is located in an area with many military, technical and research institutions. The resources of these many facilities are shared through cooperative endeavors, thereby expanding opportunities for research and education. NPS receives extraordinary support from the city of Monterey in a variety of ways ranging from

police and fire services to dedicated fiber infrastructure for high-speed communications.

NPS is developing educational and research methods for the 21st century

Through constant interaction with current military, civilian university and other institutions, NPS maintains currency with educational and research trends. One example of this is the development and expansion of a distance learning structure which expands and enhances NPS' ability to deliver education worldwide.

NPS is a national resource for shaping the future national security environment

NPS has many distinctive features – a unique student body comprised of early-to-mid-career military officers, a unique mission to provide graduate education in a military context and a unique product in the form of graduates capable of tackling problems and finding solutions to the defense and national security issues of the day. There is potential to future leverage the nation's investment in NPS to address emerging areas of study and critical needs in science, technology and engineering.

NPS: The Case for Value

Introduction

Officers in the United States armed services have unique educational needs. Although civilian and military subject-matter fundamentals are generally the same, applications of these fundamentals differ widely. Just as graduate studies in a civilian university prepare students for work in the civilian world, so military graduate students require course work suffused with military applications.

The United States Navy particularly requires graduate education in a military university because of the technical complexity of sea and shore naval operations around the world. At sea, technical requirements are becoming increasingly demanding. Other U.S. armed services also require officers with advanced education to manage the complexities of 21st century warfare. Relevant graduate education directly contributes to combat effectiveness. While ashore, working in their subspecialty areas, naval officers do staff work in a military setting. In this work, in addition to military education and experience, they require the same level of professional expertise as their civilian counterparts. Some of this work will be technical, requiring engineering and science education, while other will be managerial, benefiting from a military MBA program. Some will require cultural, linguistic, or policy expertise, particularly in relation to other nations. Military graduate education can increase the effectiveness of officers of all armed services who fill both combatant and non-combatant roles.

The Naval Postgraduate School is a military university that uniquely meets the graduate-education needs of both U.S. and allied military officers. World War II hero Admiral Arleigh Burke, NPS 1930 graduate, characterized the school aptly and succinctly in these words: "This splendid school opened a host of opportunities for the advancement of naval and military science not previously available." The only other graduate institution that can compare with NPS as a military university is its smaller and more narrowly focused sister school, the Air Force Institute of Technology (AFIT), with which NPS has an ongoing active relationship. From the establishment of NPS in 1909, the military value of NPS graduate education has continued to increase until today it greatly exceeds anything offered in the civilian world.

At NPS, unlike a civilian graduate school, military applications pervade school life both inside and outside of classes, while every student must do defense-related research. Educational effectiveness and efficiency measured by graduation rate, cost to obtain an equivalent degree, student-faculty contact hours, faculty-student ratio, and time to graduation are uniformly superior at NPS. All these are facts solidly established by the following documentation.

NPS is the Graduate School of Choice for Military Officers

Comparisons of curricula and course offerings between NPS and civilian universities with similar degree programs make clear the superior relevance of NPS for the graduate education of military officers. Few if any civilian universities have defense-focused curricula such as *Homeland Security, Special Operations, Systems Engineering and Space Systems, Undersea Warfare, Naval Systems Engineering, Combat Systems Sciences and Technology, Information Warfare*, or studies relating to the *Middle East, Africa, South Asia*. Yet these are some of the many military-oriented curricula offered at NPS. A like case can be made for special course offerings such as *Aircraft Combat Survivability, The Economics of U.S. Defense Policy, Joint Intelligence and Military Command, Joint Campaign Analysis, Radar Systems, History of Special Operations, Software Development for Combat Systems, Underwater Acoustics, Logistics Engineering, and Financial Management in the Armed Forces*. Even in NPS courses having non-military names like *Statistics*, military applications predominate, such as the use of multiple regression in manpower-requirements determination. Notably different from civilian universities, while offering traditional academic degrees, NPS encourages and even demands a military framework for its course work and related student research.¹

Outside the curricula leading to masters degrees, programs in counter-terrorism, homeland security, post-conflict security building, civil-military relations, and counter-drug strategy and policy place NPS in the forefront of educational institutions that support national security priorities.²

When students work together on research projects at NPS, not only do the project teams usually consist only of military officers but also these

¹ Secret or higher clearances are required for some courses, and the prerequisite for one course, Joint Campaign Analysis, is four or more years of experience in the field or the fleet.

² NPS faculty and students work closely with the Unified Combatant Commanders in education and research critical to the accomplishment of their missions.

officers may often be members of different military services and even from different nations. Opportunities to work or study with military colleagues across service and national boundaries exist in virtually every unclassified course at NPS. These experiences are rare, if non-existent, at civilian universities.

NPS is Swift to Respond to Changing Fleet and National Security Needs

NPS teaching and research reflects the needs of both the fleet and the Navy's shore establishment, as well as other DoD and national security priorities. As seen in the Afghanistan and Iraq conflicts, NPS responds quickly to emergent DOD war-fighting requirements and applies science and technology to address near term and high profile issues.

The mechanisms for this process, unique to NPS, are the *Educational Skill Requirements* (ESRs) for the school's curricula and the *reimbursable research program*.

Each curriculum at NPS has a Navy, DoD, or other national security sponsor, usually a Washington-based flag or general officer, as well as its own set of ESRs. The ESRs for a curriculum determine the objectives of the required courses. Biennially, NPS faculty members work with curriculum sponsors to ensure that the ESRs reflect current Navy, DoD, and national security needs. In addition to the Navy, sponsors of NPS curricula include members of the Army, the Air Force, the Marine Corps, the National Security Agency, the Department of Homeland Security, Special Operations, and the Army National Guard.

Since the sources of reimbursable research funds are commanders of Navy sea and shore facilities, as well as other DoD and national security activities, the NPS research program ensures that its work is responsive—often vitally responsive—to Navy or, more generally, national security research needs. Faculty involvement in research on national security issues also helps keep classroom instruction abreast of latest developments contributing to the enhancement of national security.

NPS Research is Uniquely Useful to Navy and DoD Activities

NPS research centers and institutes target research work on specific Navy, DoD, and other national security needs. Examples of projects worked on include electric ships, directed-energy weapons, and rail guns. As Exhibit

1 shows, fully 85% of NPS reimbursable research by faculty is directed at military concerns. No civilian university is likely to come close to this percentage. NPS students are mature military officers who make their contribution through the completion of a research thesis as a requirement for graduation. There are also 200 or so MBA students who must complete group research projects each year. Most student theses and projects, directed by faculty, address problems relating to military issues.

In the short term, NPS research, being directed at military problems, is uniquely useful to Navy and DoD activities. Like all research products, however, the products of this research often find applications in the civilian world. Former NPS faculty member Gary Kildall created the "parent" of DOS (disk operating system), which, prior to Windows, made the word- and data-processing capabilities of computers available to practically anyone who had access to a personal computer. Today, computer programs that help "smart weapons" see targets also help physicians pinpoint breast tumors for radiation therapy, and self-lubricating ball bearings developed for the space shuttle also help reduce the temperature of high-speed dentist drills. NPS cutting-edge research in areas such as electric ships and directed-energy weapons will be important not only to the Navy's future warfare capabilities but also, when applied commercially, to the enrichment of civilian life. These are just a few of many examples of military-to-civilian technology transfers. The Navy's China Lake facility has a Web site dedicated to technology transfer; NASA has a newsletter called *Goddard Tech Transfer News*. NPS also plays a key role in transforming military technology to benefit the U.S. economy. Technology transfer is an important military activity, and it occurs at NPS.

NPS Compares Favorably with Other Universities on Measures of Quality

The National Center for Educational Statistics (NCES) through its IPEDS (Integrated Postsecondary Education Data System) Web site provides numerical data useful for comparing NPS with other universities. Exhibit 2 shows a number of these comparisons. Particularly notable: although NPS has the lowest ratio of administrative staff in all categories to faculty, it has the highest faculty-student ratio within a peer group of 12 U.S. universities that share its technical and research orientation (see ranks in the bottom row).

The high faculty-student ratio at NPS reflects the absence of teaching assistants in an almost solely military student body. As a measure of

effectiveness, a high faculty-student ratio is an educational plus, but does this plus come at the expense of a costly minus in the efficient use of financial resources? Not at NPS. As shown in Exhibit 4, NPS ranks 7th lowest—and below average--among 12 institutional peers in cost per credit hour.

Graduation rate merits especial attention. Different from its peer universities, NPS does not require its applicants to take an entrance test like the Graduate Record Examination (GRE). Institutions such as Cal Tech and MIT, cited in Exhibit 2, have among the highest entrance-examination mean scores of all universities in the nation. A substantial purpose of requiring entering students to have high entrance-examination scores is to assure high student retention and graduation rates, especially in demanding curricula. Though important, academic aptitude measured by entrance tests is not the only personal attribute contributing to student success. Traits in the realm of motivation and character also contribute to this success, and NPS students, who throughout their careers are routinely evaluated in fitness reports, tend to have such traits in abundance. NPS knows its applicants well. This, reinforced by the military success ethos pervasive at the school, is likely the reason that NPS has a 97% graduation rate despite the absence of an entrance test.

Still, a reasonable question is how NPS students might compare with other graduate students on the GRE. NPS has addressed this question by administering the GRE on a number of occasions in the past, the finding being that NPS students in the samples tested scored above average on the GRE. That result is not surprising. While not directly testing academic *aptitude*, each curriculum at NPS requires its applicants to have an educational *achievement profile* measured by three digits of an Academic Profile Code (APC) reflecting undergraduate grades overall, as well as courses and grades in mathematics and science.

Student-faculty contact hours constitute an important measure on which to compare NPS with its peer universities. At four quarters per year, 12 weeks per quarter, and 16 classroom hours per week, NPS averages an annual total of 768 student-faculty contact hours, or 1,152 student-faculty contact hours in a typical six-quarter NPS master's degree program. These numbers vary at civilian universities. According to an NPS technical report,³ U.S. graduate students attending non-military schools typically attend classes

³ Gates, W. R., Maruyama, X. K., Powers, J. P., Rosenthal, R. E., & Cooper, A. W. M. (1998). A bottom-up assessment of Navy flagship schools: the NPS faculty critique of CNA's report (Report No. NPS-FC-98-00). Monterey, CA: Naval Postgraduate School.

13 hours per week for 32 weeks in a standard academic year plus, sometimes, 7 hours per week in a 10-week summer term. That is an annual maximum of 486 student-faculty contact hours at a typical civilian university. The NPS contact-hour experience is clearly superior: about 58% greater at NPS than at a typical civilian university ($100 \times (768 - 486)/486$).

Since NPS has no graduate assistants, as noted earlier, all courses at NPS are taught by faculty. If for this reason alone, NPS students are uniquely fortunate. Measured by degree source and research activity, the NPS faculty is comparable in academic strength with any other technical university in the world.

A Degree Costs Much Less at NPS than at a Peer University

What are the comparable costs of a degree at NPS and its peer universities? To complete a master's degree program having contact hours equal to those at NPS, a student would have to attend a civilian university for about 28 months ($12 \times 1,152/486 = 28.4$), as opposed to only 18 months at NPS. This difference has tremendous cost implications favoring NPS. Assuming equal student-faculty contact hours and equal faculty pay, it implies that the cost for a student to earn a graduate degree is on average almost 58% more at a civilian graduate school than at NPS ($100 \times (28.4-18)/18$).

Even a cost differential as high as 58% underestimates the true difference because it fails to take into account student pay over the ten extra months (opportunity cost).

Cost per credit hour is a vehicle for getting at the true difference. Although NPS does not charge tuition for Navy and Marine Corps students, the NPS operating budget shown in Exhibit 3 for FY2002, together with the 1,336 students on board that year, provides data for estimating NPS cost per credit hour comparable with credit-hour costs at peer institutions. This estimate depends on the total instructional cost, which from Exhibit 3 may be calculated as the direct academic cost (\$48.8 million) plus the fraction of direct base-operations cost attributable to non-reimbursed academic functions (\$27.4 million times $48.8/185.2$, the 185.2 being total expenditures minus student salary): \$56,019,869. Dividing this total instructional cost by the 1,336 students on board in FY2002 and by 64 credit hours per year (16 per quarter) results in the estimate of \$655 per credit hour at NPS. This number compares with an average of \$724 at NPS's peer institutions, as shown in the first column of Exhibit 4.

What would a master's degree cost if the Defense Department sent students to a civilian university rather than to NPS? The entire cost differential between NPS and other universities must take into account 10 months of a student's salary because a student would have to attend a civilian university 10 months longer than NPS to obtain an equivalent degree. The second and third columns of Exhibit 4 show the results of accounting for student pay, determined from Exhibits 3 and 5 by dividing student salary (\$129.3 million) by the number of military students (943) in 2002 and multiplying the result by 10/12: \$114,263.

Unlike civilian universities, NPS curricula include courses that U.S. military students must take for credit toward their Joint Professional Military Education (JPME) requirements. The expense of providing these courses would add to the cost of sending U.S. military officers to a civilian university instead of NPS.

NPS Graduates Show the Value of their Education in Future Assignments

NPS counts among its graduates at least 34 astronauts, a number of service secretaries, and hundreds of officers of flag rank. Among NPS's distinguished military alumni: Admiral Arleigh Burke (World War II hero and former Chief of Naval Operations), Captain Eugene Cernan (astronaut who last walked on the moon), Admiral Moshe Marom (Vice Chief of Naval Operations, Israeli Navy), Admiral Henry Mauz (former Commander in Chief of the Atlantic Fleet), Admiral Hyman Rickover ("father" of the nuclear Navy), Admiral James Watkins (former CNO and Secretary of Energy), Admiral James D. Watkins (former CNO), Admiral Michael Mullen (former Vice Chief of Naval Operations), Vice Admiral Arthur Cebrowski (current Director of the Office of Force Transformation for the Secretary of Defense), Rear Admiral Wayne E. Meyer (former Deputy Commander for Weapons and Combat Systems, Naval Sea Systems Command, and "father" of the Aegis weapons system), Captain William "Deak" Parsons (former Associate Director of Los Alamos Laboratory), Captain James Roche (current Secretary of the Air Force), and Brigadier General Thomas White (former Secretary of the Army). Among notable DRMI short-course graduates: HRM Abdullah (King of Jordan), HRM Aisha (Princess of Jordan), Ricardo Lopez Murphy (Minister of Defense, Argentina), Girts Valdis Kristovskis (Minister of Defense, Latvia), Vasile Dudu (Minister of Defense, Romania), and Renato de

Villa (Minister of Defense, Philippines). Some NPS graduates have also attained notable achievement in the civilian world, one outstanding example being Gordon Eubanks (former CEO of Symantec and current CEO of OBLIX), another Kevin Sharer (CEO of Amgen). The unique combination of military and civilian ingredients in NPS graduate education increases the value of a military officer in both combat and non-combat roles. NPS graduates show the value of their education in subsequent military assignments and in later civilian careers, as well.

NPS provides daily interactions among military officers of other nations and U.S. offices of different services

NPS provides valuable opportunities for U.S. and international military officers to interact in educational activities focused on military problems. International officers sit side-by-side in classes at NPS with U.S. officers. During the academic year 2003-2004, NPS had 356 international degree-seeking students out of a student body of 1,491. These international students represented 60 different countries. The School of International Graduate Studies (SIGS), one of NPS's four graduate schools, and the NPS Center for Executive Education provide especially rich opportunities for such interaction. The Defense Resources Management Institute (DRMI) at NPS has long delivered high-quality short courses tailored to the needs of international officers. The local community provides civilian support for DRMI by "adopting" its students—warmly welcoming and familiarizing them with American society and culture. Monterey—with NPS, the DLI-FLC (Defense Language Institute – Foreign Language Center), and MIIS (Monterey Institute of International Studies) at its center—is a highly sought-after destination for international students.

In all four of NPS's graduate schools, officers of different military services study together. Exhibit 5 shows this distribution, together with international officers and civilians, in average-on-board (AOB) numbers for 2003. Though administered by the Department of the Navy, NPS is a graduate-education home to members of all U.S. armed services.

NPS Exists Geographically in a Symbiotically Rich Military and Technological Environment

The Monterey Bay area is home to a number of military institutions in

addition to NPS. Notable among these are the Defense Language Institute – Foreign Language Center (DLI-FLC), the Naval Research Laboratory (NRL), the Defense Manpower Data Center (DMDC), the Army’s Monterey TRADOC (Training and Indoctrination) Element, and the Fleet Numerical Meteorology and Oceanography Center (FNMOC). This is the Monterey Model: sharing and leveraging resources. All these institutions collaborate on military educational and research programs, as well as efforts to effect civilian regional improvement. In libraries, laboratories, and other venues, faculty, students, and staff at NPS have opportunities to work with their counterparts at these other local institutions in constantly emerging cooperative endeavors.

The nearby Silicon Valley, with its many cutting-edge information-technology companies such as Cisco Systems and Seagate (not to mention Apple Computer and Sun Microsystems), provides numerous opportunities for mutually beneficial links between NPS and industry.

NPS is Developing Education and Research Methods for the 21st Century

NPS is well on its way into the 21st century in both its teaching and its research programs.

Life-long learning and distance (or distributed) learning (DL) are occupying an increasingly large portion of the educational activities of universities throughout the United States, and NPS is in the forefront of this movement. In a military extremely busy with operational activities, not all potential students have time for residence at a university. Many need to pursue their studies while deployed elsewhere around the world. NPS meets this current challenge. In addition to its roughly 1,600 full-time students, NPS currently has more than 600 DL students in degree and non-degree programs, and that number is increasing. For all its merits, it must be remembered that distance learning must be supported by a first class teaching institution such as NPS. It is noted that another 10,000 students enroll in NPS short courses each year.

In addition to planning a program of systematic curriculum-content reviews by faculty members of peer institutions, the school is currently engaged in and pursuing partnerships with many other universities, including Stanford University, the Massachusetts Institute of Technology, the Virginia Polytechnic Institute, Purdue University, the University of Maryland, the University of California at Santa Barbara, and the University of Southern California. These links help to keep NPS curricula abreast of current

developments in academia. As NPS faculty focuses on military problems, its capability to address these problems must be constantly nourished by contact with civilian developments in teaching and research. NPS will maintain its currency in Information Technology (IT) with continued participation in national advanced networking, as well as consortia of universities and other research centers. These involvements will provide NPS faculty and students with tools required for leading-edge education and research. As the new century proceeds, NPS will seek to intensify its academic interactions by enhancing its sabbatical program, encouraging exchanges with faculties of other universities, and developing an increasingly active post-doctoral research program. NPS can be extremely attractive to post-doctoral fellows because of its unique access to Navy and DoD research funding. The return to NPS and DoD will be great since post-doctoral fellows from universities throughout the world can bring with them the latest developments in theory and methodology that might have important applications to military problems.

NPS is a national resource for shaping the future national security environment

Like other research universities, NPS develops research methods and creates research products, but, unlike others, NPS concentrates its efforts almost solely on military problems or concerns. Particularly notable is that the NPS faculty focuses primarily on improving the military usefulness of its students rather than on replicating itself, e.g., as economists or physicists, or on preparing its students for work in civilian business administration or professions other than the military. The otherwise rare academician who eschews self-replication is commonplace at NPS, and his or her presence here constitutes a great measure of what makes NPS unique, as well as relevant, to Navy and DoD needs.

At the same time, NPS civilian and military faculty are comparable in quality to the faculty at high-productivity research universities on measures such as source of terminal degree and current research publication rate, as well as service as consultants to military organizations.

NPS accepts students in early-to-mid-career and through refresher and transition courses, virtually unique in graduate-level academia, prepares non-technical undergraduate majors for graduate study in technical curricula. At NPS, undergraduate music or history majors have entered the space program as engineers. The time spent in the one or two quarters of refresher or

transition work is made up in NPS's uniquely efficient programming of courses. At NPS, the courses that a student needs to take are always available when the student needs to take them.⁴ A student at NPS wastes no time waiting for the availability of a required course.

NPS qualifies nationally as a Carnegie Research Intensive University, ranking 81st in 2001 among hundreds of comparable institutions in expenditures of federal research dollars, this reported in *The Top American Research Universities 2003* by John V. Lombardi, et al. NPS programs are also accredited by the Senior College Commission of the Western Association of Schools and Colleges (WASC), the Accreditation Board for Engineering and Technology (ABET),⁵ the Association to Advance Collegiate Schools of Business (AACSB), and the National Association of Schools of Public Affairs and Administration (NASPAA). NPS not only compares well with its civilian counterparts; as a military university, NPS is unique in its class.

NPS is one of the vitally important contact points between the military and civilian worlds, particularly in the realm of education and research. At these points, the two worlds help sustain and strengthen each other. Amidst the international culture and technical vibrancy of the Monterey area, NPS interacts in a richly synergistic intellectual environment. The Naval Postgraduate School is a uniquely valuable national asset.

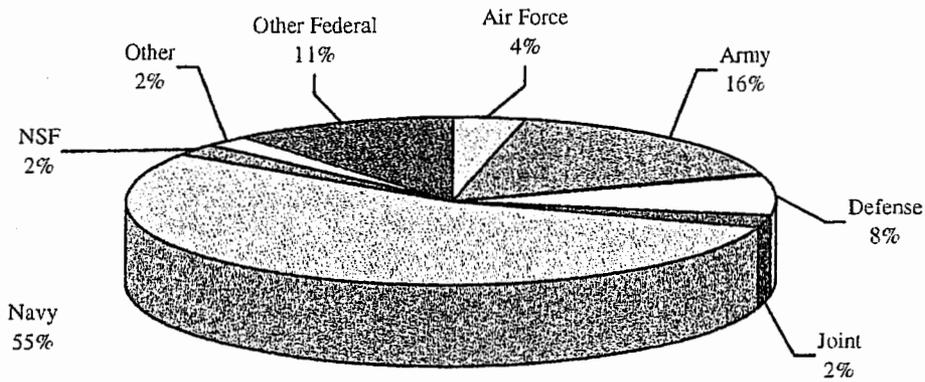
⁴ Although sometimes a potential class size is too small to justify offering a course within a concentration option, this is not the case within streams of required courses.

⁵ The NPS programs accredited by the Engineering Accreditation Commission of ABETS are Electrical Engineering, Mechanical Engineering, Aeronautics, and Astronautics.

Exhibit 1. Reimbursable Research Programs: 2002

Size of Program: \$57,060.1K
Faculty Work Years: 165.72
Staff Work Years: 23.20

Sponsor Support



Source: NPS Research Office

NPS Office of Institutional Research

Exhibit 2. Comparison of NPS with Peer Institutions: Fall 2001

Institution	<i>Total FTE Faculty</i>	<i>Total FTE Students*</i>	<i>Faculty per 100 FTE Students*</i>	<i>Total Staff Personnel per 100 FTE Faculty</i>
Naval Postgraduate School	465	1,514	31	59
California Institute of Technology	554	2,058	27	213
Carnegie Mellon University	1,146	8,036	14	132
Georgia Institute of Technology	1,861	14,528	13	110
Illinois Institute of Technology	437	4,487	10	83
Massachusetts Institute of Technology	1,771	9,941	18	292
North Carolina State University at Raleigh	2,392	24,736	10	72
Purdue University (Main Campus)	3,494	36,826	9	72
Rensselaer Polytechnic Institute	746	7,220	10	106
Rice University	543	4,324	13	139
Rochester Institute of Technology	971	12,327	8	101
University of Southern California	3,371	27,361	12	97
Average excluding NPS	1,571	13,804	13	129
NPS Rank (out of 12, with 1 highest)	11	12	1	12

*For NPS, FTE Students is Average on Board (AOB)

Source: IPEDS

Exhibit 3. NPS Financial Summary: FY2002

Category	<i>Amount*</i>	<i>Percent</i>
Student salary	129.3	41.1
Reimbursable academic	80.6	25.6
Direct academic	48.8	15.5
Direct base operations	27.4	8.7
Reimbursable base operations	17.7	5.6
Military staff salary	9.7	3.1
Non-appropriated funds	1.0	0.3
Total	314.5	99.9

*In millions of dollars

Exhibit 4. Cost Comparisons of NPS & Peer Institutions: 2002

Institution	<i>Cost per Credit Hour¹</i>	<i>Cost for 96 Credit Hours</i>	<i>Cost + 10-month Pay²</i>
Naval Postgraduate School	655	62,880	62,880
California Institute of Technology	724	69,504	183,767
Carnegie Mellon University	366	35,136	149,399
Georgia Institute of Technology	558	53,568	167,831
Illinois Institute of Technology	610	58,560	172,823
Massachusetts Institute of Technology	442	42,432	156,695
North Carolina State University at Raleigh	871	83,616	197,879
Purdue University (Main Campus)	540	51,840	166,103
Rensselaer Polytechnic Institute	1,320	126,720	240,983
Rice University	1,030	98,880	213,143
Rochester Institute of Technology	613	58,848	173,111
University of Southern California	891	85,536	199,799
Average excluding NPS	724	69,513	183,776
NPS Rank (out of 12, with 1 the lowest)	7	7	1

Exhibit 5. Resident Students by Academic School: 2003

<i>School</i>	<i>Navy</i>	<i>Marine Corps</i>	<i>Army</i>	<i>Air Force</i>	<i>International</i>	<i>Other</i>	<i>Total</i>
Graduate School of Business and Public Policy	98	50	14	8	59	34	263
Graduate School of Engineering and Applied Sciences	224	23	12	12	106	75	452
Graduate School of Operational and Information Sciences	176	88	59	23	153	84	583
School of International Graduate Studies	34	24	16	38	57	34	203
Total	532	185	101	81	375	227	1,501

Note. Eight students not listed in a school are omitted

Source: Office of the Registrar

– Average On Board

NPS Office of Institutional Research